Low voltage AC drives

General machinery drives
Main features and dimensions

Unique features

- Fast and extensive I/O
- PID control
- Application macros
- Many installation possibilities
- 200 to 480 V, 1-phase or 3-phase

More value for money

- Possibility to have IP 21 enclosure
- Very fast and accurate control
- Extremely good repeatability
- Cost optimization without the panel

Mounting options

In addition to the conventional wall mounting and time-saving DIN rail mounting, ACS140 also offers flange-mounting. The heatsink is located outside the enclosure and hence the major share of the power loss is external to the enclosure.

Heatsinkless series

In cases where space is a limitation, drives without a heatsink can be delivered as standard. The user has to provide an installation surface with sufficient cooling. For more information, please refer to the ACS140 User's Manual.

Mounting options

heatsinkless

wall mounting

mounting on DIN rail

flange mounting

Dimensions

frame size H | frame size A | frame size B | frame size C | frame size D

1-phase supply with heatsink

Type/order code	Nominal motor	Nominal ratings			Max. output current	Over-current (peak)	Over-temp. (heat-sink)	Line fuse[1]	Power losses	
		Frame size/ weight	Input current	Output current					Power circuit	Control circuit
	P_N [2] kW	kg	I_{1N} A	I_{2N} A	A	A	°C	A	W	W
ACS141-K18-1	0.12	A/0.9	2.7	1.0	1.5	3.2	90	6	7	8
ACS141-K25-1	0.18	A/0.9	4.4	1.4	2.1	4.5	90	6	10	10
ACS141-K37-1	0.25	A/0.9	5.4	1.7	2.6	5.5	90	10	12	12
ACS141-K75-1	0.37	A/0.9	6.9	2.2	3.3	7.1	90	10	13	14
ACS141-1K1-1	0.55	A/0.9	9.0	3.0	4.5	9.7	90	10	19	16
ACS141-1K6-1	0.75	B/1.2	10.8	4.3	6.5	13.8	90	16	27	17
ACS141-2K1-1	1.1	C/1.6	14.8	5.9	8.9	19.0	95	16	39	18
ACS141-2K7-1	1.5	C/1.6	18.2	7.0	10.5	23.5	95	20	48	19
ACS141-4K1-1	2.2	D/1.9	22.0	9.0	13.5	34.5	95	25	70	20

1-phase supply heatsinkless

Type/order code	Nominal motor	Nominal ratings			Max. output current	Over-current (peak)	Over-temp. (heat-sink)	Line fuse[1]	Power losses	
		Frame size/ weight	Input current	Output current					Power circuit	Control circuit
	P_N [2] kW	kg	I_{1N} A	I_{2N} A	A	A	°C	A	W	W
ACS141-H18-1	0.12	H/0.8	2.7	1.0	1.5	3.2	90	6	7	8
ACS141-H25-1	0.18	H/0.8	4.4	1.4	2.1	4.5	90	6	10	10
ACS141-H37-1	0.25	H/0.8	5.4	1.7	2.6	5.5	90	10	12	12
ACS141-H75-1	0.37	H/0.8	6.9	2.2	3.3	7.1	90	10	13	14
ACS141-1H1-1	0.55	H/0.8	9.0	3.0	4.5	9.7	90	10	19	16
ACS141-1H6-1	0.75	H/0.8	10.8	4.3	6.5	13.8	90	16	27	17

3-phase supply with heatsink

Type/order code	Nominal motor	Nominal ratings			Max. output current	Over-current (peak)	Over-temp. (heat-sink)	Line fuse[1]	Power losses	
		Frame size/ weight	Input current	Output current					Power circuit	Control circuit
	P_N [2] kW	kg	I_{1N} A	I_{2N} A	A	A	°C	A	W	W
ACS143-K75-1	0.37	A/0.8	3.2	2.2	3.3	7.1	90	6	13	14
ACS143-1K1-1	0.55	A/0.8	4.2	3.0	4.5	9.7	90	6	19	16
ACS143-1K6-1	0.75	B/1.1	5.3	4.3	6.5	13.8	90	6	27	17
ACS143-2K1-1	1.1	C/1.5	7.2	5.9	8.9	19.0	90	10	39	18
ACS143-2K7-1	1.5	C/1.5	8.9	7.0	10.5	23.5	95	10	48	19
ACS143-4K1-1	2.2	D/1.8	12.0	9.0	13.5	34.5	95	16	70	20

3-phase supply with heatsink

Type/order code	Nominal motor	Nominal ratings			Max. output current	Over-current (peak)	Over-temp. (heat-sink)	Line fuse[1]	Power losses	
		Frame size/ weight	Input current	Output current					Power circuit	Control circuit
	P_N [2] kW	kg	I_{1N} A	I_{2N} A	A	A	°C	A	W	W
ACS143-K75-3	0.37	A/0.8	2.0	1.2	1.8	4.2	90	6	14	14
ACS143-1K1-3	0.55	A/0.8	2.8	1.7	2.6	5.6	90	6	20	16
ACS143-1K6-3	0.75	B/1.1	3.6	2.0	3.0	6.6	90	6	27	17
ACS143-2K1-3	1.1	C/1.1	4.8	2.8	4.2	9.2	90	6	39	18
ACS143-2K7-3	1.5	C/1.5	5.8	3.6	5.4	11.9	95	10	48	19
ACS143-4K1-3	2.2	D/1.8	7.9	4.9	7.4	16.3	95	10	70	20

3-phase supply heatsinkless

Type/order code	Nominal motor	Nominal ratings			Max. output current	Over-current (peak)	Over-temp. (heat-sink)	Line fuse[1]	Power losses	
		Frame size/ weight	Input current	Output current					Power circuit	Control circuit
	P_N [2] kW	kg	I_{1N} A	I_{2N} A	A	A	°C	A	W	W
ACS143-H75-3	0.37	H/0.8	2.0	1.2	1.8	4.2	90	6	14	14
ACS143-1H1-3	0.55	H/0.8	2.8	1.7	2.6	5.6	90	6	20	16
ACS143-1H6-3	0.75	H/0.8	3.6	2.0	3.0	6.6	90	6	27	17
ACS143-2H1-3	1.1	H/0.8	4.8	2.8	4.2	9.2	90	6	39	18

[1] Fuse type: UL class CC or T. For non-UL installations IEC269 gG.
[2] P_N rated motor power. The power ratings in kW apply to most 2- and 4-pole IEC 34 motors. The current ratings are the same regardless of supply voltages. The rated current of the ACS100 drive must be higher than or equal to the rated motor current to achieve the rated motor power given in the table.

Mains connection

Power range	0.12 to 2.2 kW
Voltage	1-phase and 3-phase, 200 to 240 V, ±10% 3-phase, 380 to 480 V, ±10%
Frequency	48 to 63 Hz
Power Factor	0.98 Use 60°C rated power cable (75°C if T_{amb} above 45°C).
Max. wire sizes (mm²)	4 single core/torque 0.8 Nm

Motor connection

Voltage	3-phase, from 0 to U_{SUPPLY}
Frequency	0 to 300 Hz
Continuous loading capability (constant torque at a max. ambient temperature of 40°C)	Rated output current I_{2N}
Overload capacity (at a max. ambientat temp. of 40°C)	At constant torque 1.5 x I_{2N}, for 1 minute every 10 minutes At constant torque 1.25 x I_{2N}, for 2 minutes every 10 minutes Characteristic data for short-time, intermittent and periodic load cycles are available on request.
Switching frequency	Standard 4 kHz, Low-noise 8 kHz, Silent 16 kHz
Acceleration time	0.1 to 1800 s
Deceleration time	0.1 to 1800 s
For max. motor cable lengths see „Options/Input and Output Chokes“	

Programmable control connections

Max. wire sizes (mm²)	0.5-1.5 (AWG 22...AWG 16)/torque 0.4 Nm
Two analog inputs:	
Voltage signal	0 (2) to 10 V, 200 kΩ single-ended
Current signal	0 (4) to 20 mA, 500 Ω single-ended
Potentiometer reference value	10 V ±2% max. 10 mA, 1 kΩ ≤ R ≤ 10 kΩ
Response time	≤ 60 ms
Resolution	0.1%
Accuracy:	±1%
One analog output	0 (4) to 20 mA, load <500 Ω
Auxiliary voltage	12 V DC, max. 100 mA
Five digital inputs	12 V ... 24 V DC with internal or external supply, PNP and NPN
Input impedance	1.5 kΩ
Response time	≤ 9 ms
Two relay outputs	
Switching voltage	12 to 250 V AC or max 30 V DC/0.5 A
Maximum continuous current	10 mA to 2 A
Serial communication for control panel or external control	Modbus protocol

Protection limits

Overvoltage, 200 to 240 V units	
Running V DC	420 (corr. to 295 V input)
Start inhibit V DC	390 (corr. to 276 V input)
Overvoltage, 380 to 480 V units	
Running V DC	842 (corr. to 595 V input)
Start inhibit V DC	661 (corr. to 380 - 415 V input) 765 (corr. to 440 - 480 V input)
Undervoltage, 200 to 240 V units	
Running V DC	200 (corr. to 142 V input)
Start inhibit V DC	230 (corr. to 162 V input)
Undervoltage, 380 to 480 V units	
Running V DC	333 (corr. to 247 V input)
Start inhibit V DC	436 (corr. to 380 - 415 V input) 505 (corr. to 440 - 480 V input)

Environmental limits

Ambient temperatures	Output current = I_2, f_{switch} = 4 kHz: 0 to 40°C Output current = 0.8 · I_2, f_{switch} = 4 kHz: 40 to 50°C Output current = I_2, f_{switch} = 8 kHz: 0 to 30°C Output current = 0.9 · I_2, f_{switch} = 8 kHz: 30 to 40°C Output current = 0.75 · I_2, f_{switch} = 16 kHz: 0 to 30°C
Altitude	Output current = I_2: 0 to 1000 m Output current reduced by 1% per 100 m over 1000 m to 2000 m
Relative humidity (without condensation)	lower than 95%
Protection class	IP 20
Paint colour	NCS 1502-Y, RAL 9002, PMS 420 C
Contamination levels	no conductive dust, corrosive liquids or gases (IEC 721-3-3).

Product compliance

Low Voltage Directive 73/23/EEC with supplements
EMC Directive 89/336/EEC with supplements
Quality assurance system ISO 9001 and ISO 14001
CE, UL, ULc and C-Tick approvals

Options

Control panel
Extension cable 3 m with IP 65 Kit for control panels PEC-98-0008
RS 485/232 adapter
DriveWindow Light 2
EMC IP 20 input filters
Brake units and choppers
Fieldbus modules
Input and output chokes
NEMA 1/ IP 21 Installation kits

Control panel

Type/order code: ACS100 - PAN

ACS140 drives can be bought with or without a detachable control panel. If you prefer to buy the drive without the control panel we still offer you a chance to have the panel as an option. Using the control panel, parameters can be exchanged between two ACS140 drives.

This is called parameter upload/download procedure.

RS 485/232 Adapter

Type/order code: ACS140 RS 485/232

If you want to control the ACS140 drive via Modbus or use the DriveWindow Light 2 software you need to replace the panel with the RS 485/232 adapter. When the adapter is used, several ACS140 units can be controlled using Modbus protocol. The modbus communication also creates the base for controlling the drive via other gateways.

Panel Extension Cable Kit

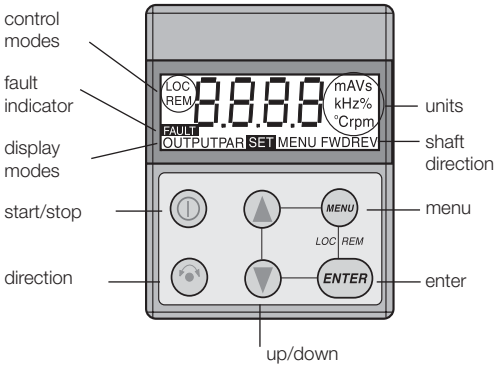
Type/order code: PEC-98-0008

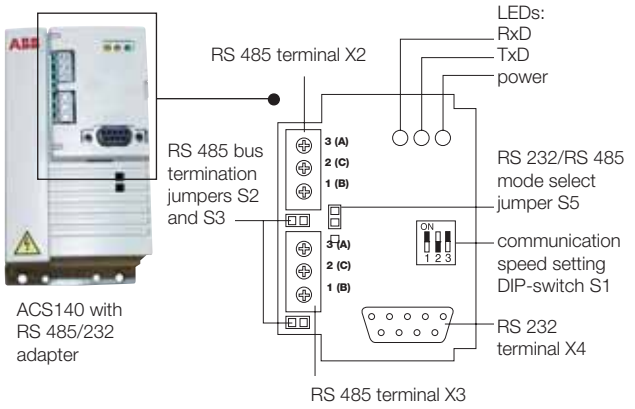
This option includes a gasket, a 3 m connection cable for control panels, fixing material for the cables and a drilling jig. With this kit IP 65 protection class is achieved.

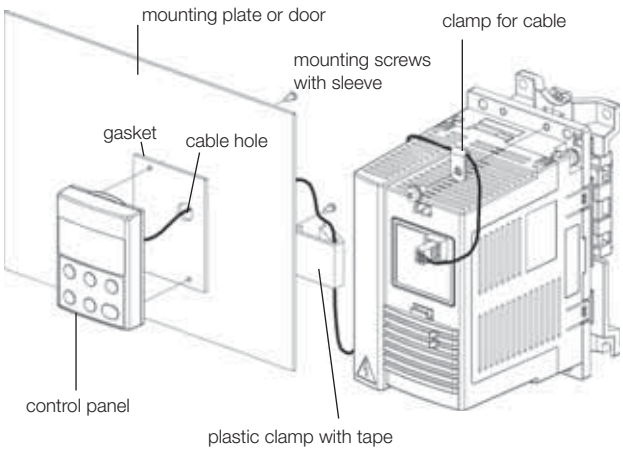
ABC fieldbus modules

Type/order codes: ABC-PDP and ABC-DEV

Up to ten drives can be controlled with one ABC fieldbus module. The drives may be of type ACS140 and ACS160. ABC modules are available for Profibus (type code ABC-PDP) and DeviceNet (type code ABC-DEV) fieldbus protocols. The module is DIN rail mountable with protection class IP 20. The ABC module requires 24 V DC power supply and provides an RS 485 Modbus interface for communication with the drives. The response time on the Modbus network is approximately 200 ms per drive.







EMC Filters

Instructions to comply with EN61800-3:

To comply with:

- 1st Environment, unrestricted distribution, please contact your ABB drives channerl partner.
- 1st Environment, restricted distribution, always use optional RFI filter as specified in the table below.

To comply with:

- 2nd Environment, unrestricted distribution, always use optional RFI filter as specified in the table below
- 2nd Environment, restricted distribution, always use optional RFI filter as specified in the table below. If RFI filters are to be avoided, an EMC plan has to be created between the customer and the sales person.

1-phase supply voltage 200 to 240 V, 0.12 to 2.2 kW

Type/order code	Filter type	Max. motor cable length m Switching frequency						Dimensions			
		1st environment			2nd environment			A	B	C	D
		4 kHz	8 kHz	16 kHz	4 kHz	8 kHz	16 kHz	mm	mm	mm	mm
ACS141-K18-1, -H18-1	ACS100/140-IFAB-1	30	20	10	50	50	10	81	186	191	42
ACS141-K25-1, -H25-1	ACS100/140-IFAB-1	30	20	10	50	50	10	81	186	191	42
ACS141-K37-1, -H37-1	ACS100/140-IFAB-1	30	20	10	50	50	10	81	186	191	42
ACS141-K75-1, -H75-1	ACS100/140-IFAB-1	30	20	10	75	75	10	81	186	191	42
ACS141-1K1-1, -1H1-1	ACS100/140-IFAB-1	30	20	10	75	75	10	81	186	191	42
ACS141-1K6-1, -1H6-1	ACS100/140-IFAB-1	30	20	10	75	75	10	81	186	228	42
ACS141-2K1-1	ACS100/140-IFCD-1	30	20	10	75	75	10	81	286	211	42
ACS141-2K7-1	ACS100/140-IFCD-1	30	20	10	75	75	10	81	286	211	42
ACS141-4K1-1	ACS100/140-IFCD-1	30	20	10	75	75	10	81	286	218	42

3-phase supply voltage 380 to 480 V, 0.37 to 2.2 kW

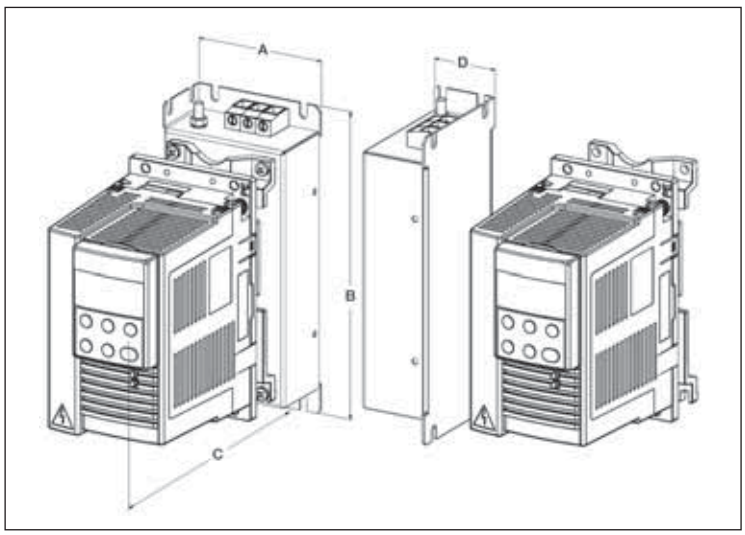
Type/order code	Filter type	Max. motor cable length m Switching frequency						Dimensions			
		1st environment			2nd environment			A	B	C	D
		4 kHz	8 kHz	16 kHz	4 kHz	8 kHz	16 kHz	mm	mm	mm	mm
ACS143-K75-3, -H75-3	ACS140-IFAB-3	30	20	10	30	30	10	81	186	191	42
ACS143-1K1-3, -1H1-3	ACS140-IFAB-3	30	20	10	50	50	10	81	186	191	42
ACS143-1K6-3, -1H6-3	ACS140-IFAB-3	30	20	10	50	50	10	81	186	228	42
ACS143-2K1-3, -2H1-3	ACS140-IFAB-3	30	20	10	50	50	10	81	286	211	42
ACS143-2K7-3	ACS140-IFCD-3	30	20	10	50	50	10	81	286	211	42
ACS143-4K1-3	ACS140-IFCD-3	30	20	10	50	50	10	81	286	218	42

RFI filter type code ACS100 -FLT-C allows you to use longer motor cables.
Please contact your ABB drives channel partner. IFAB, IFCD and FLT-C filters with protection class IP 20.

Note! With types ACS...H mount the filter next to the drive.

3-phase supply voltage 200 to 240 V, 0.37 to 2.2 kW

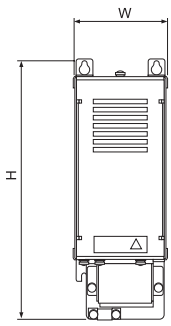
Use EMC filter type ACS140-FLT-C with all ACS103-xKx-1 converter types. Maximum motor cable length is 100 m in 1st Environment, restricted distribution with 4 kHz and 8 kHz switching frequency. For ACS103-4K1-1 with EMC filter the maximum continuous load is 70% of nominal.

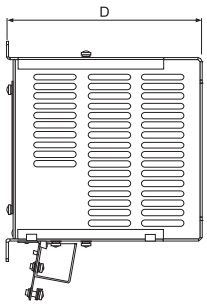


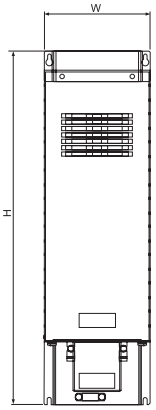
NEMA 1/ IP 21 Installation Kit

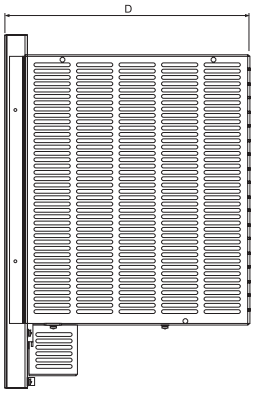
Type/order code: NEMA 1/ IP 21

With this installation kit NEMA 1/ IP 21 protection class is achieved for ACS140 and for the EMC filter, if the filter is attached directly to the drive.









Brake Options

Compact-sized brake units which include brake chopper and resistor, can be used with ACS140.

Brake units technical data

Brake unit type/order code	Frequency converter input voltage	Resistor OHM	Continuous output W	Max. output 20 s W
ACS-BRK-A	200 – 240 V AC 380 – 480 V AC	400	150	350 1000
ACS-BRK-B	200 – 240 V AC 380 – 480 V AC	150	400	1000 2400
ACS-BRK-C	200 – 240 V AC 380 – 480 V AC	32	2000	4500 12000
ACS-BRK-D	200 – 240 V AC 380 – 480 V AC	10.5	7000	14000 42000
ACS-BRK-E	200 – 240 V AC –	4	5000	30000
ACS-BRK-F	200 – 240 V AC –	50	400	2400

Dimensions

Brake unit type/order code	Width mm	Height mm	Depth mm	Weight kg
ACS-BRK-A	90	240	180	1.2
ACS-BRK-B	90	300	285	1.5
ACS-BRK-C	150	500	347	7.5
ACS-BRK-D	270	600	450	20.5
ACS-BRK-E	270	600	450	18.5
ACS-BRK-F	90	300	285	1.5

Brake Choppers

With a brake chopper the customer selects the resistor used. This ensures an optimum match between the equipment and the requirements.

Brake choppers technical data

Brake chopper type/order code	Fequency converter input voltage	Resistance OHM	Continuous output W	Max. output 20 s W
ACS-BRK-BL	200 - 240 V AC 380 - 480 V AC	150	400	1000 2400
ACS-BRK-CL	200 - 240 V AC 380 - 480 V AC	32	2000	4500 12000

Dimensions

Brake chopper type/order code	Width mm	Height mm	Depth mm
ACS-BRK-BL	93	250	75
ACS-BRK-CL	125	360	106.5